

REVIEW OF WORKING DRAWINGS FOR TIEBACK ANCHORS

Current contract special provisions for structures incorporating tieback anchors allow the contractor to select a tieback system which will furnish the required force at the locations shown on the contract plans. Additionally the contract special provisions may permit the contractor to furnish a fewer number of greater capacity tiebacks or a greater number of lesser capacity tiebacks than are shown on the plans.

The contract special provisions require conformance with Section 50, "Prestressing Concrete," of the Standard Specification which requires the submittal for review of working drawings for the tieback anchor system the contractor intends to employ.

The applicable portions of the instructions in Memo to Designers 11-1, *Review of Working Drawings Prestressed Concrete*, apply to the review of the working drawings for tieback anchors with the following modification in distribution:

The set of drawings of the initial submittal which is routed to the Prestressed Concrete committee will be forwarded by them to the Earth Retaining Systems section before being returned to the design section.

In addition to the applicable portions of Memo to Designers 11-1, the following items are pertinent to the review of working drawings for tieback anchors:

1. When the contract allows, and the contractor chooses to furnish a different number of tieback anchors, the submittal should include calculations and details demonstrating that his redesign is equivalent to the design in the contract plans. Items to be considered are:
 - a. Total horizontal and vertical components of the tieback design force are to be equivalent in magnitude and distribution.
 - b. The unbonded and bonded lengths of the tiebacks are to be not less than shown on the plans.
 - c. Any affected structural component is to be redesigned and adequate details provided if the structural component is not adequate.
 - d. Adequacy of the redesign for all stages of construction.
 - e. Impact on aesthetics of structure.
2. The stress in the tendon should not exceed $0.75 f_{pu}$ when the maximum test load is applied.

Normal values for f_{pu} (minimum tensile strength)

Bars - ASTM Designation: A722 Type II	150 ksi
Strands - ASTM Designation: A416	270 ksi

Supersedes Memo to Designers 5-14 dated November 1981

3. The unbonded and bonded lengths of the tendon must not be less than required in the contract plans.
4. The anchoring devices at the end of the tendon shall be of an approved type. The Prestressed Concrete committee maintains a record of all anchoring devices that have been approved by the Transportation Laboratory.
5. The design and details of the anchorage system used to distribute the tieback design force to the structure shall conform to the requirement in the special provisions and contract plans. The anchorage system is generally composed of one or more of the following elements: bearing plate, trumpet tube, waler, side plates, support bars and associated welding, and also when electrical isolation is required, the elements providing the electrical isolation. If the contractor uses a material for an element of the anchorage system for which allowable stresses are not specified in the special provisions, it will be necessary to evaluate the allowable stresses he used in his calculations to determine if they are appropriate.
6. The various elements that make up the corrosion protection should be specified and should conform to the requirements in the special provision and contract plans. The type of material used for the sheathing, its inside and outside diameters or one diameter and an associated wall thickness should be indicated.
7. The stages, and their limits, of grouting of the drilled hole should be indicated.
8. Tendon stressing sequence if required by the contract.
9. The placement of tendon centralizers should be indicated.
10. The minimum size of drilled hole to be used should be indicated so that it can be determined that the minimum grout cover for the tendon can be obtained.
11. When shims are used in connection with locking off strand tendons against the structure, the estimated thickness of the shims required and supporting calculation should be provided.
12. If the contractor intends to use an admixture in the drill-hole grout, it should be indicated and its compliance with the provisions in the Standard Specifications verified and or approved by the Engineer.
13. Calculations supporting the bond length shown for the tieback anchor are not required to be furnished. If calculations supporting the bond length proposed are furnished, they should be evaluated for reasonableness. If the proposed bond length is substantially different from that shown on the plans it should be determined why. The bond length calculations should be in terms of resisting the maximum test load. The method of drilling, placing the tieback tendon, and grouting the drilled hole should be indicated. The value of bond stress between grout and

foundation material used should be evaluated for appropriateness. If necessary, consult with the Geotechnical Branch for their evaluation of the bond stress value used. If insufficient information is provided to evaluate the bond length calculations, the following statement should be placed on the working drawings:

"The bond length calculations have not been evaluated. Contractor is responsible for providing tieback anchors that satisfy the contract."

If the bond length calculations indicate a length that is considered to be less than an appropriate length, the following statement should be placed on the working drawings:

"Contractor is responsible for providing tieback anchors that satisfy the contract."

Special applications in the use of tieback anchors may require additional information to be included on the working drawings.



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